hydroxylamine, $NH_2OH . HCl$, in alcohol, in a flask provided with an inverted condenser, adding the requisite quantity of zinc oxide, and boiling the liquid until it is quite clear. Upon cooling, crystals of the compound are deposited. These crystals are very permanent in their behaviour towards solvents; they resist organic solvents completely, and are only slightly attacked by water. They are rendered much more unstable by rise of temperature, and explode most violently when an attempt is made to fuse them. If, however, they are carefully warmed up to 120° in a flask connected with a series of U-tubes, they dissociate regularly, a gas being rapidly evolved, which condenses to a liquid, mainly in the first U-tube. This liquid is very rich in hydroxylamine, but owing to the dehydrating action of the zinc chloride, contains small quantities of decomposition products. This destructive action of the zinc chloride may be altogether avoided, however, if another base capable of replacing the hydroxylamine in the compound is present during the distillation. The base which M. Crismer finds most effective is aniline. About ten grams of the zinc salt are added to twenty cubic centimetres of freshly distilled aniline, and the mixture is submitted to distillation under reduced pressure. Under these circumstances a liquid of very high refractive power distils over. In a few minutes this liquid commences to crystallize in large colourless lamellæ, and upon surrounding the receiver with ice-cold water the whole completely crystallizes. These crystals, when washed with a little ether to remove a trace of aniline which is mechanically carried over, are found to correspond to the formula NH_2OH. They are identical in all respects with those described by M. Lobry de Bruyn. They dissolve in all proportions in water, and the solution possesses the ordinary properties of aqueous hydroxylamine. The crystals are very deliquescent, attracting moisture with the utmost avidity. They melt at the temperature of the hand. The compound of zinc chloride and aniline, which remains in the distillation flask, may be obtained from solution in boiling alcohol in minute snow-white crystals.

THE second method by which anhydrous hydroxylamine may be prepared consists in passing dry ammonia gas into an emulsion of the zinc compound $ZnCl_2 . 2NH_2OH$ in absolute ether. As soon as the first bubbles of ammonia enter the flask an energetic reaction occurs, the zinc salt swells up rapidly, and eventually the whole of the hydroxylamine is liberated, and is dissolved by the ether. The clear ethereal solution is subsequently decanted, and the ether removed by distillation *in vacuo*, when white crystals of hydroxylamine remain in the vessel in which the distillation is carried out. The only precaution necessary in adopting this mode of preparation is to employ a tolerably large proportion of ether, as hydroxylamine does not dissolve in that liquid to a very large extent. M. Crismer finds it most convenient to perform the experiment in an apparatus so constructed that the extraction by ether of the product of the action of ammonia is continuous.

THE additions to the Zoological Society's Gardens during the past week include three Rhesus Monkeys (*Macacus rhesus* ♂ ♂ ♀) from India, presented respectively by Dr. Hewetson, Mr. H. Godfrey, and Mr. W. A. Morgan; a Puma (*Felis concolor*) from Sante Fe, Argentine Republic, presented by Mr. Thos. Bowers; a Musanga Paradoxure (*Paradoxurus musanga*) from the Indian Archipelago, presented by Mr. J. Watson; a Grey Ichneumon (*Herpestes griseus*) from India, presented by Mr. W. Needham; an Azara's Agouti (*Dasyprocta azaræ*) from British Guiana, presented by Mr. R. Scott-Brass; a Northern Mocking Bird (*Mimus polyglottus*) from North America, presented by Major N. Gosselin; two Brown Hyænas (*Hyæna brunnea* ♂ ♀) from South Africa, a Two-toed Sloth (*Cholopus didactylus*) from Demerara, purchased.

OUR ASTRONOMICAL COLUMN.

CAPTURE OF COMETS BY PLANETS.—During the last two or three years several astronomers have studied the action of planets in changing the orbits of comets which pass near them, and a considerable amount of interest has been aroused in this problem. Prof. H. A. Newton, in the *American Journal of Science* for September and December, establishes a number of propositions relative to the perturbations by planets which lead to the annexation of comets. Some of the results obtained may be expressed as follows:—(1) If a comet passes in front of Jupiter, the kinetic energy of the comet is diminished; if it passes behind the planet, the kinetic energy of the comet is increased. (2) The greatest effect of perturbation of a planet moving in a circular orbit in shortening the periodic time of a comet originally moving in a parabola is obtained if the comet's original orbit actually intersects the planet's orbit at an angle of 45°, and if the comet is due first at the point of intersection, at the instant when the planet's distance therefrom is equal to the planet's distance from the sun multiplied by the ratio of the mass of the planet to the mass of the sun. (3) If in a given period of time 1,000,000,000 comets come in parabolic orbits nearer to the sun than Jupiter, 126 of them will have their orbits changed into ellipses with periodic times less than one-half that of Jupiter; 839 of them will have their orbits changed into ellipses with periodic times less than that of Jupiter; 1701 of them will have their orbits changed into ellipses with periodic times less than one and a half times that of Jupiter; and 2670 of them will have their orbits changed into ellipses with periodic times less than twice that of Jupiter. (4) Of the 839 comets which are reduced to have periodic times less than Jupiter's period, 203 will, after perturbation, have retrograde motions, and 639 will have direct motions. (5) Somewhat more than five times as many of these comets move in direct orbits inclined less than 30° to Jupiter's orbit as move in retrograde orbits inclined less than 30° to Jupiter's orbit. It may therefore be said that comets which are changed by the perturbing action of a planet from parabolic orbits of every possible inclination to the ecliptic into short period ellipses must, as a rule, move in orbits of moderate inclination, and with direct motions.

LAW OF LIMITING APERTURES.—The results of some interesting photometric experiments connected with the application of the law of limiting apertures to small object-glasses are given by Dr. E. J. Spitta in *Monthly Notices R.A.S.*, November 1891. The apertures of six object-glasses were reduced to one-half and one-quarter respectively, and the intensity of a point at the focus of each was then photometrically tested. The numbers obtained were in neither case proportional to the square of the linear aperture of the object-glass, and they indicated that the outer zones do not contribute as much to the intensity of the image at the focus as they should do theoretically. Some photometric observations by Dr. Müller, of Potsdam, also show that the brilliancy of the focal image is only very slightly affected by blotting out the outer parts of his object-glass; the observed and computed intensities being very discordant until the diameter had been diminished to about one-half. Dr. Spitta believes that the cause of the difference lies in the aplanatisation of the glasses used.

CONNAISSANCE DES TEMPS for 1893, and the extract from the one for 1892, containing information useful for mariners, have just been received from the Bureau des Longitudes. The arrangement appears to be the same as usual, and no comment as to its excellence is needed.

ORTHOGRAPHY OF GEOGRAPHICAL NAMES.

THE Council of the Royal Geographical Society have just issued a circular letter, signed by Sir M. E. Grant Duff, the President of the Society, on this important subject. The following are its principal passages:—

In 1885 the Council, impressed with the necessity of endeavouring to reduce the confusion existing in British maps with regard to the spelling of geographical names, in consequence of the variety of systems of orthography used by travellers and others to represent the sound of native place-names in different parts of the world, formally adopted the general principle which had been long used by many, and the recognition of which had been steadily gaining ground, viz. that in writing geographical native

© 1891 Nature Publishing Group

names vowels should have their Italian significance, and consonants that which they have in the English language.

This broad principle required elucidation in its details, and a system based upon it was consequently drawn up with the intention of representing the principal syllabic sounds. The object aimed at was to provide a system which should be simple enough for any educated person to master with the minimum of trouble, and which at the same time would afford an approximation to the sound of a place-name such as a native might recognize. No attempt was made to represent the numberless delicate inflexions of sound and tone which belong to every language, often to different dialects of the same language. For it was felt not only that such a task would be impossible, but that an attempt to provide for such niceties would defeat the object.

The adoption by others of the system thus settled has been more general than the Council ventured to hope. The charts and maps issued by the Admiralty and War Office have been, since 1885, compiled and extensively revised in accordance with it. The Foreign and Colonial Offices have accepted it, and the latter has communicated with the colonies, requesting them to carry it out in respect to names of native origin. Even more important, however, than these adhesions is the recent action of the Government of the United States of America, which, after an exhaustive inquiry, has adopted a system in close conformity with that of the Royal Geographical Society, and has directed that the spelling of all names in their vast territories should, in cases where the orthography is at present doubtful, be settled authoritatively by a committee appointed for the purpose. The two great English-speaking nations are thus working in harmony.

The Council, by printing the rules in "Hints to Travellers," and by other means, have endeavoured to insure that all travellers connected with the Society should be made aware of them; but as it is possible that some bodies and persons interested in the question may still be in ignorance of their existence and general acceptance, they feel that the time has come to again publish them as widely as possible, and to take every means in their power to aid the progress of the reform.

To this end, and with a view to still closer uniformity in geographical nomenclature in revisions of editions of published maps, a gigantic task requiring many years to carry out, the Council have decided to take steps to commence tentatively indexes of a few regions, in which the place-names will be recorded in the accepted form.

RULES.

The rules referred to are as follows:—

1. No change is made in the orthography of foreign names in countries which use Roman letters: thus Spanish, Portuguese, Dutch, &c., names will be spelt as by the respective nations.

2. Neither is change made in the spelling of such names in languages which are not written in Roman character as have become by long usage familiar to English readers: thus Calcutta, Cutch, Celebes, Mecca, &c., will be retained in their present form.

3. The true sound of the word as locally pronounced will be taken as the basis of the spelling.

4. An approximation, however, to the sound is alone aimed at. A system which would attempt to represent the more delicate inflexions of sound and accent would be so complicated as only to defeat itself. Those who desire a more accurate pronunciation of the written name must learn it on the spot by a study of local accent and peculiarities.

5. *The broad features of the system* are:—

(*a*) That vowels are pronounced as in Italian and consonants as in English.

(*b*) Every letter is pronounced, and no redundant letters are introduced. When two vowels come together, each one is sounded, though the result, when spoken quickly, is sometimes scarcely to be distinguished from a single sound, as in *ai*, *au*, *ei*.

(*c*) One accent only is used, the acute, to denote the syllable on which stress is laid. This is very important, as the sounds of many names are entirely altered by the misplacement of this "stress."

6. Indian names are accepted as spelt in Hunter's "Gazetteer of India," 1881.

The following amplification of these rules explains their application:—

Letters.	Pronunciation and remarks.	Examples.
a	*ah*, *a* as in *father*	Java, Banána, Somáli, Bari.
e	*eh*, *a* as in *fate*	Tel-el-Kebír, Oléleh, Yezo, Medina, Levúka, Peru.
i	English *e*; *i* as in *ravine*; the sound of *ee* in *beet* ... ... Thus, not *Feejee*, but	Fiji, Hindi.
o	*o* as in *mote*	Tokyo.
u	long *u* as in *flute*; the sound of *oo* in *boot*. *oo* or *ou* should never be employed for this sound ... ... Thus, not *Zooloo*, but	Zulu, Sumatra.
	All vowels are shortened in sound by doubling the following consonant	Yarra, Tanna, Mecca, Jidda, Bonny.
	Doubling of a vowel is only necessary where there is a distinct repetition of the single sound	Nuulúa, Oosima.
ai	English *i* as in *ice*	Shanghai.
au	*ow* as in *how* ... Thus, not *Foochow*, but	Fuchau.
ao	is slightly different from above	Macao.
aw	as in *law*.	
ei	is the sound of the two Italian vowels, but is frequently slurred over, when it is scarcely to be distinguished from *ey* in the English *they*	Beirút, Beilúl.
b	English *b*.	
c	is always soft, but is so nearly the sound of *s* that it should be seldom used	Celébes.
	If *Celébes* were not already recognized it would be written *Selébes*.	
ch	is always soft as in *church*	Chingchin.
d	English *d*.	
f	English *f*. *ph* should not be used for the sound of *f* ... ...Thus, not *Haiphong*, but	Haifong, Nafa.
g	is always hard. (Soft *g* is given by *j*)	Galápagos.
h	is always pronounced when inserted.	
hw	as in *what*; better rendered by *hw* than *wh*, or *h* followed by a vowel, thus, *Hwang ho*, not *Whang ho*, or *Hoang ho*	Hwang ho, Ngan hwi.
j	English *j*. *Dj* should never be put for this sound	Japan, Jinchuen.
k	English *k*. It should always be put for the hard *c* ... ... Thus, not *Corea*, but	Korea.
kh	The Oriental guttural	Khan.
gh	is another guttural, as in the Turkish	Dagh, Ghazi.
l m n	As in English.	
ng	has two separate sounds, the one hard as in the English word *finger*, the other as in *singer*. As these two sounds are rarely employed in the same locality, no attempt is made to distinguish between them.	
p	As in English.	
ph	As in *loophole*	Chemulpho, Mokpho
th	stands both for its sound in *thing*, and as in *this*. The former is most common.	Bethlehem.
q	should never be employed; *qu* (in *quiver*) is given as *kw*	Kwangtung.
	When *qu* has the sound of *k* as in *quoit*, it should be given by *k*.	
r s sh t v w	As in English.	Sawákin.
x		
y	is always a consonant, as in *yard*, and therefore should never be used as a terminal, *i* or *e* being substituted as the sound may require. Thus, not *Mikindány*, but not *Kwaly*, but	Kikúyu. Mikindáni. Kwale.
z	English *z*	Zulu.
zh	The French *j*, or as *s* in *treasure*	Muzhdaha.
	Accents should not generally be used, but where there is a very decided emphatic syllable or stress, which affects the sound of the word, it should be marked by an *acute* accent	Tongatábu, Galápagos, Paláwan, Saráwak.

---

[1] The *y* is retained as a terminal in this word under Rule 2 above. The word is given as a familiar example of the alteration in sound caused by the second consonant.

© 1891 Nature Publishing Group